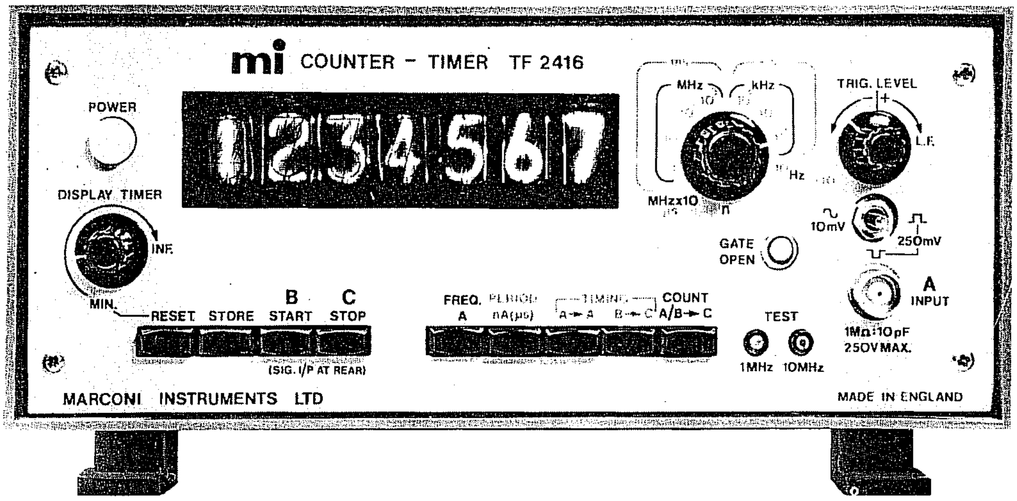
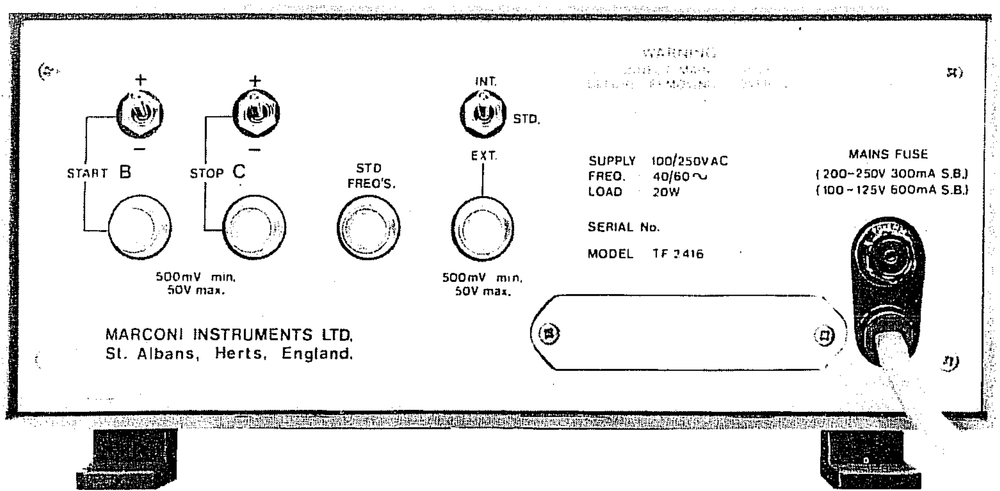
50 MHz Counter Timer

Malden Electronics
(Venner) 7737

☐ Direct frequency measurement up to 50 MHz
☐ 0,1 µsec timing resolution
☐ 10 mV sensitivity over entire frequency range
☐ Reference oscillator and printer output options
☐ Small and light-weight





Rear view of TF 2416

In this compact 50 MHz Counter Timer TF 2416, integrated-circuit techniques have been employed to achieve a standard of performance, reliability and measurement versatility normally associated with larger and more expensive instruments. Cost is kept low by the inclusion of a specially designed multi-stage MOS counting module. Alternative versions of the TF 2416 are available, providing a choice of three internal reference oscillators and a choice of two optional printer outputs. Details of these alternative versions appear in the specification.

The Display

The display system consists of a seven-tube in-line readout, with automatic indication of decimal point. Units of measurement – i.e. kHz, msec, etc. – are indicated by the switch settings. A storage memory maintains the display while the count is in progress to give a continuous coherent readout, only those digits that alter being affected by successive counting. Steadily drifting frequencies can, for example, be monitored at a high sampling rate without ambiguity. If desired, the memory may be switched off so that the display follows the decades as the count proceeds.

Printer Output

Either one of two types (serial or parallel output) of four-line b.c.d. (1-2-4-8) printer drive output can be provided as an optional facility. The output is drawn via a multiway plug at the rear of the instrument. Positive logic is used, with less than +0,5 volts representing '0' condition and more than +3,5 volts representing '1' condition.

Frequency Measurement

Direct measurement of frequency up to 50 MHz can be made, with gate times ranging from 0,1 µsec to 10 sec, switch selected in decade steps. The measured frequency is read directly in Hz, kHz, or MHz depending on switch position selected.

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FREQUENCY
(Input A)

Max. frequency	50 MHz.
Gating time	0,1 µsec to 10 sec. in decade steps.
Accuracy	±1 count ± crystal stability.

MULTI-PERIOD
(Input A)

Max. frequency	1 MHz.
Gating time	1 to 10^7 periods in decade steps.
Units of measurement	0,1 µsec.
Accuracy	±0,1 µsec ± crystal stability.

TIMING

Time units	0,1 µsec to 10 sec in decade steps.
Control input	*Single line.* input A *Two line:* start-input B stop-input C or manual push button.
Accuracy	±0,1 µsec $^{+0}_{-1}$ time unit, ± crystal stability.

COUNT
(Input A)

Max. frequency	50 MHz.
Control	Start – input B Stop – input C or manual push button.

INPUT CHARACTERISTICS
(Input A)

Frequency range	10 Hz to 50 MHz sinewave. D.C. to 50 MHz pulse.
Input selector	+ d.c.; – d.c.; a.c.
Input sensitivity	10 mV r.m.s. } on a.c. 15 mV pk pulse } 250 mV sinewave } on + (⎍) or 350 mV pk pulse } – (⊔)
Trigger slope	Negative on a.c. and – (⊔). Positive on + (⎍).
Trigger level	A.C. adjustable ±50 mV approx. + (⎍) } adjustable ±1 volt – (⊔) } approx.
Frequency response	Response limited at max. positive trigger level. Sensitivity falls off above 10 kHz at approx. 6 dB/octave.
Max. input	250 volts r.m.s.
Input impedance	1 MΩ, 30 pF approx.
Input coupling	A.C.
Max. d.c. level	400 volts.
Controls	Trigger level/response 3 position. Slope/sensitivity selector.

(Inputs B and C)

Frequency range	100 Hz to 5 MHz (sinewave at rated sensitivity). D.C. to 5 MHz pulse. Min. pulse width 50 nsec.
Sensitivity	500 mV r.m.s. sinewave, 1 volt pk. pulse.
Max. input	100 volts pk.
Input impedance	20 kΩ, 60 pF approx.
Input coupling	A.C.
Max. d.c. level	250 volts.
Trigger slope	Positive or negative.
Controls	Slope selection. Manual push button.

EXTERNAL REFERENCE

Frequency range	100 Hz to 10 MHz (sinewave at rated sensitivity).
Sensitivity	500 mV r.m.s. sinewave, 1 volt pk. pulse.
Max. input	100 volts pk.
Input impedance	20 kΩ, 60 pF approx.
Input coupling	A.C.
Max. d.c. level	250 volts.
Trigger slope	Negative only.

DISPLAY	7 digit display on side view numerical indicator tubes. Decimal point automatically positioned by functional controls. Units of measurement indicated by switch settings. *Gate open* indicator neon.
DISPLAY STORAGE	Switch selected normal or stored.
DISPLAY TIME	Adjustable 0,1 sec to 5 sec, plus infinite.
INTERNAL REFERENCE	Three versions are available. (i) 10 MHz crystal controlled oscillator. *Ageing rate:* $\pm1\times10^{-7}$ per month. *Temperature coefficient at 23°C:* $\pm3\times10^{-7}$/°C typically. *Maximum drift −10°C to +55°C:* $\pm5\times10^{-6}$. (ii) 10 MHz temperature compensated oscillator. *Ageing rate:* $\pm1\times10^{-7}$ per month. *Temperature coefficient at 23°C* $\pm1\times10^{-7}$/°C. *Maximum drift 0°C to 50°C:* $\pm1\times10^{-6}$. (iii) 10 MHz oven controlled oscillator. *Ageing rate:* $\pm1\times10^{-7}$ per month. *Temperature coefficient at 23°C:* $\pm1\times10^{-8}$/°C max. *Maximum drift −10°C to +55°C:* $\pm3\times10^{-7}$.
TEST OUTPUTS	*Amplitude:* 2,5 volts p-p minimum. *Output impedance:* 1 kΩ.
10 MHz	*Internal standard:* 10 MHz squarewave to reference specification. *External standard:* Squarewave to external reference frequency and specification.
1 MHz	*Internal standard:* 1 MHz squarewave to reference specification. *External standard:* Squarewave to external reference frequency ÷10, and to external reference specification.
STD. FREQ. OUTPUTS	Output from divider chain as selected by gating time switch. 2,5 volts p-p min. squarewave.
POWER REQUIREMENTS	100 to 125, 200 to 250 volts, 45 to 60 or 400 Hz.
DATA OUTPUT	Two optional versions are available. (a) 4 wire b.c.d. serial output, 1-2-4-8 code. (b) 4 wire per digit parallel output 1-2-4-8 code.

ALTERNATIVE VERSIONS

TF 2416	Internal reference (i). No data output.
TF 2416/1	Internal reference (ii). No data output.
TF 2416/2	Internal reference (iii). No data output.
TF 2416/3	Internal reference (i). Data output (a).
TF 2416/4	Internal reference (i). Data output (b).
TF 2416/5	Internal reference (ii). Data output (a).
TF 2416/6	Internal reference (iii). Data output (a).
TF 2416/7	Internal reference (ii). Data output (b).
TF 2416/8	Internal reference (iii). Data output (b).

DIMENSIONS AND WEIGHT

Height	Width	Depth	Weight
89 mm	216 mm	310 mm	4 kg
3,5 in	8,5 in	12,0 in	8,8 lb

ACCESSORIES

Optional	Extender Board, 16 way, double-sided.

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